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LLNL Data Disk Evaluation Report and Information Gathering Document #449.R1.3

A. BeLue

September 29, 2015

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68338 Interdepartmental letterhead

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RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

Ext: 2-3346

WCG 15-003

September 17, 2015

TO: Distribution
FROM: A. Belue
SUBJECT: Data Storage Disk Evaluation

Attached is the report on Data Storage Disk Evaluation and characterization. The purpose of this memo is to capture new recipients due to some recent characterization issues with the Hammer Mill process. The Data Storage Disk Evaluation report was generated utilizing data acquired during 2009 and 2010 from submitted storage media. Report was submitted to DUS personnel (to include: Dremalas, K., Sieg, D., Coleman, S. Walden, K., Rayome, J., Salvo, V.). Purpose was to determine the characterization of the different electronic media for future segregation, management and processing.

CC:

Characterization chemist

Coleman, S.

Moran, C.

Terusaki, S.

Akers, J.

Fischer, R.

DATA STORAGE DISK EVALUATION



Anthony Be Lue

Radioactive and Hazardous Waste Management

Sampling Acquisition and Analysis Process: Sample disks will be acquired in sets of at least two. One item will be analyzed for STLC and the other for TCLP. TTLC analysis will not be performed since the TTLC is a hot acid digestion, depending on the construction of the sample the item will in most cases fail the TTLC for the regulated metals. Therefore the extraction techniques will be employed since the TCLP and the STLC methods are designed to simulate the leaching a waste will undergo if disposed of in a sanitary landfill. The procedure requires the sample to be milled to pass through a No.10 sieve for STLC and a 9.5 mm sieve for TCLP. The solid particles that do not pass through the sieve are discarded and are considered extraneous and irrelevant as a hazardous material. In this case these sample items will be ground by a laboratory according to their size reduction procedure (GEL laboratory designator COMP) to meet as closely as possible the requirements of the procedure. See the following examples of storage items for analysis. Larger versions of the sampled and analyzed items are attached.



Fig. 1Fujitsu limited Model MAJ3182MP jFig. 2 Maxtor YAR51HWO

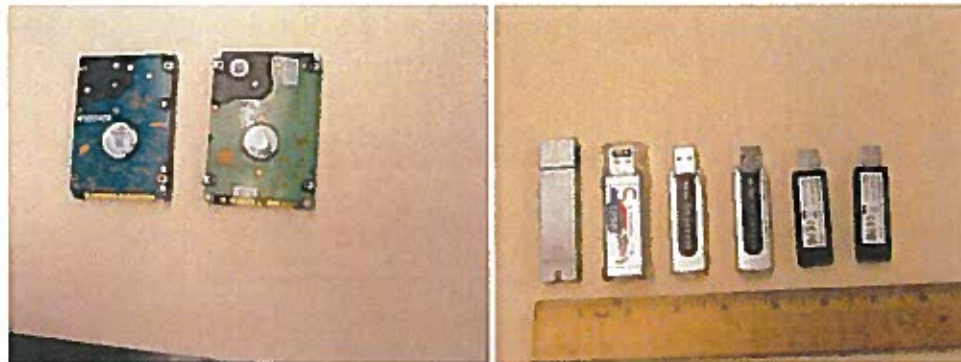


Fig.3 left TOSHIBA MK8026GAX
Right IBM Travelstar
IC25N030ATDA04-0

Fig.4Various flash drives

Results are as follows:

The following results are original TTLC results with the STLC and TCLP results derivations.

COC 17689/--3/30/09

CDRW CDR READ/WRITEABLE

| ANALYTE | TTLC (mg/kg) | STLC (mg/L) | TCLP (mg/L) |
|---------|--------------|-------------|-------------|
| Sb | 6.06 | 0.60 | 0.30 |
| Ba | 4.68 | 0.47 | 0.23 |
| Cr | 1.43 | 0.14 | 0.07 |
| Ni | 0.52 | 0.05 | 0.03 |
| Ag | 0.53 | 0.05 | 0.03 |
| Zn | 31.2 | 3.12 | 1.56 |
| Cu | 0.748 | 0.075 | 0.04 |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

COC 17689/--3/30/09

FD - 3.5 FLOPPY DISKS

| ANALYTE | TTLC (mg/kg) | STLC (mg/L) | TCLP (mg/L) |
|---------|--------------|-------------|-------------|
| Sb | 0.55 | 0.055 | 0.027 |
| Ba | 0.13 | 0.013 | 0.006 |
| Cr | 0.12 | 0.012 | 0.006 |
| Ni | 0.58 | 0.058 | 0.029 |
| V | 0.10 | 0.010 | 0.005 |
| Zn | 2.53 | 0.253 | 0.126 |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

COC 17689/--3/30/09

CDC - COMMERCIAL CD ROMS

| ANALYTE | TTLC (mg/kg) | STLC (mg/L) | TCLP (mg/L) |
|---------|--------------|-------------|-------------|
| Ba | 0.11 | 0.01 | 0.006 |
| Cr | 0.13 | 0.01 | 0.006 |
| Ni | 0.75 | 0.07 | 0.04 |
| Zn | 1.99 | 0.19 | 0.09 |
| Cu | 0.44 | 0.04 | 0.02 |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

COC 17689/--3/30/09

CRRT COMPUTER REEL TO REEL TAPES

| ANALYTE | TTLC (mg/kg) | STLC (mg/L) | TCLP (mg/L) |
|---------|--------------|-------------|-------------|
| Ni | 4.28 | 0.43 | 0.21 |
| Sb | 26.4 | 2.64 | 1.32 |
| Cr | 5.18 | 0.52 | 0.26 |
| Co | 2.01 | 0.20 | 0.10 |
| Ag | 1.02 | 0.10 | 0.05 |
| Zn | 72.7 | 7.27 | 3.63 |
| Se | 42.4 | 4.24 | 2.12 |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

For the following results are actual STLC and TCLP only results.

COC 18198/--10/26/10

| | Fujitsu HDD | Toshiba HDD | USB-1 |
|----------------|--------------------|--------------------|--------------------|
| ANALYTE | STLC (mg/L) | STLC (mg/L) | STLC (mg/L) |
| Sb | 5.17 | 3.68 | 5.96 |
| Ba | 4.56 | 11.0 | 10.1 |
| Cr | 0.34 | 0.28 | 0.12 |
| Co | 0.18 | 3.36 | 0.05 |
| Cu | 43.7 | 2.81 | 0.04 |
| Ni | 22.5 | 25.2 | 31.8 |
| Se | 0.09 | 0.19 | 0.11 |
| V | 0.03 | 0.05 | 0.03 |
| Zn | 3.66 | 1.39 | 4.37 |
| Pb | 5.41 | 3.16 | 504 |
| Mo | --- | 0.13 | 0.02 |
| Ag | --- | 0.03 | --- |
| As | --- | --- | 0.15 |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

COC 18198/--10/26/10

| | Maxtor HDD | IBM HDD | USB-2 | Samsung SSD | Apple 821 |
|----------------|-------------------|-------------------|-------------------|--------------------|-------------------|
| ANALYTE | TCLP(mg/L) | TCLP(mg/L) | TCLP(mg/L) | TCLP(mg/L) | TCLP(mg/L) |
| Sb | --- | 0.11 | --- | 0.03 | --- |
| Ba | 2.37 | 0.68 | 0.68 | 2.4 | 19.1 |
| Cr | 0.03 | 0.06 | 0.05 | 0.04 | --- |
| Co | --- | 0.13 | 1.42 | 0.02 | --- |
| Cu | 0.04 | 0.44 | --- | 2.34 | --- |
| Ni | 0.38 | 39.1 | 15.2 | 7.41 | --- |
| Se | 0.07 | 0.09 | --- | --- | --- |
| V | --- | --- | --- | --- | --- |
| Zn | 2.46 | 101 | 0.96 | 217 | --- |
| Pb | 28.0 | 0.12 | 20.8 | --- | --- |
| Hg | --- | --- | 0.0007 | --- | --- |
| Mo | --- | --- | 0.04 | 0.02 | --- |

Comments: All positive results, above the detection limit are reported. Results bold and in italics exceed regulatory limits.

COMMENTS/CONCLUSIONS: The analysis of the various storage media was based on types, sizes and availability of types. Some items were combined to closely match the weight requirements of the extraction methods. Others were analyzed separately by either STLC or TCLP methods.

Since the STLC method is more rigorous than the TCLP, historical results are predominantly show STLC => than TCLP. In order to maximize results and since sample splitting was not feasible, either STLC or TCLP methods were selected or the results evaluated against each other to determine the hazardous properties. For example items failing TCLP would indicate a failure by STLC.

Distribution:

Dremalas, K.
Simpson, T.
Coleman, L.
Crawford, L.
Salvo, V.
Rayome, J.
Fischer, R.





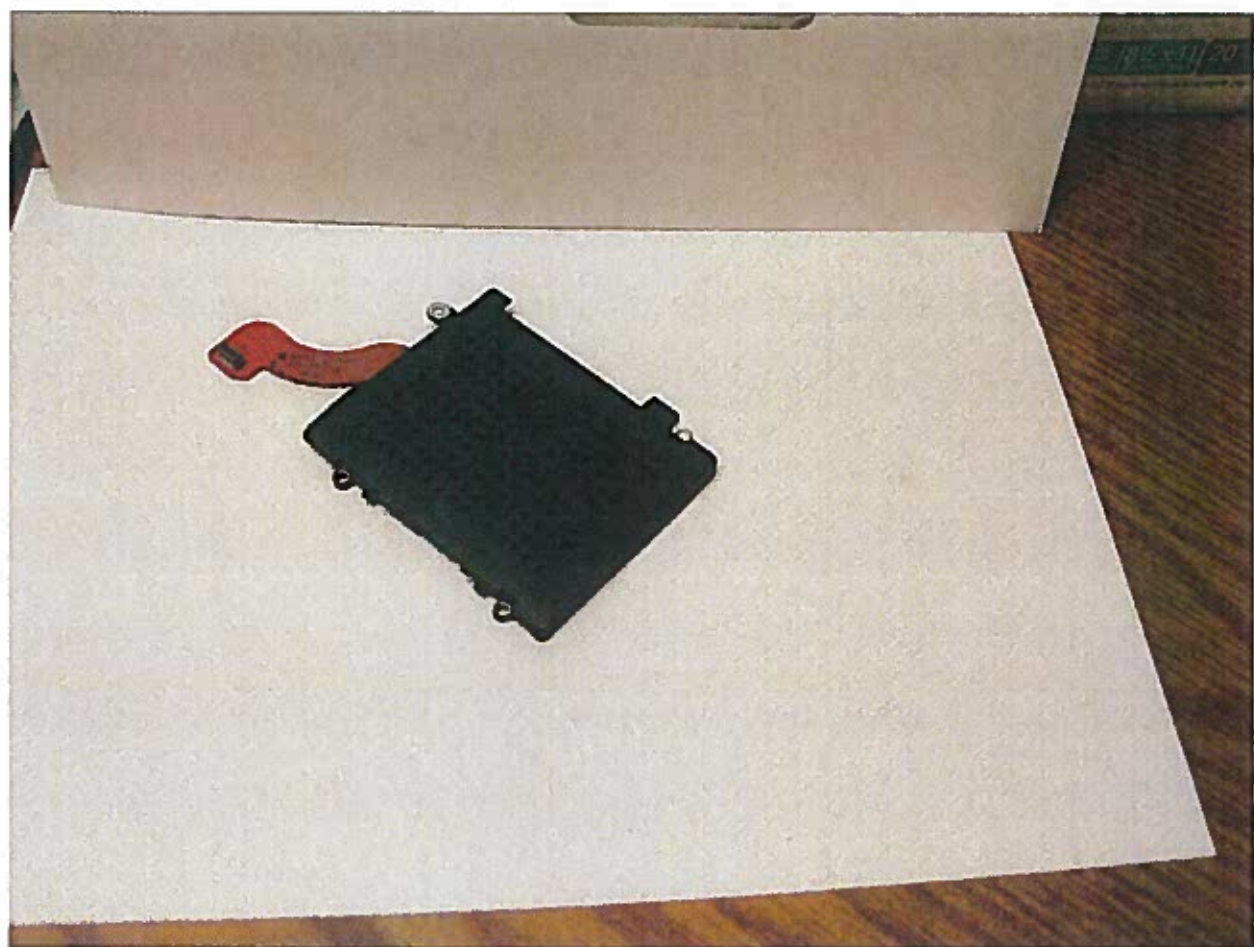
TOSHIBA
DISK DRIVE MK8026GAX
HDD02191 C ZK01 T
DC+5V 1.0A
#30 AC/PAG01S
S/N YSLD9770T 6N6 EC.A
150GB (150,000 cylinders) 7200 RPM (150,000 cylinders)
150GB (150,000 cylinders) 7200 RPM (150,000 cylinders)

CAUTION
HANDLE ONLY BY SIDES OF CASE
DO NOT OPEN DISK DRIVE
DO NOT TOUCH THE TOP COVER
HANDLE WITH CARE

97.2 grams







Waste Characterization Summary

IGD No.: 00449:R13

Waste Type: RCRA HAZ (H)

Disposal Site:

| | | | |
|-------------|-----------------|----------------|-------------------|
| Field Tech | Efren Sifuentes | Approval Date | 06/23/2015 |
| Revision | 1.3 | Legacy IGD No. | 0297-9999-01-H-OG |
| Waste Form | Solid | Profile | |
| Periodicity | Ongoing | SPCC | No |

| Generators | | | | | | |
|----------------|-----------------|---------|-------------|-----------------|---------------------|--------------|
| Name | Contact Phone | OUN | Employee Id | Phone | Email | Locations |
| Walsh, Gregory | +1 925 422 9762 | walsh13 | 004056 | +1 925 422 9762 | walsh13@ad.llnl.gov | B297-OUTSIDE |

Detail Process Description

Organic ground media from destructive declassification operations including, but not limited to: computer tapes, VHS tapes, cartridges tapes, X-ray films, microfiche films and overhead projector films. E.A. and I.H. will inform Plant Engineering and the Chemists about the presence of regulated metals not appearing on this IGD so that appropriate steps are taken. Test for Visual Verification & TTLC, STLC, TCLP metals when regulated metals are used.

| Routine/Non-routine | Non-routine Proj. No. |
|---------------------|-----------------------|
| Routine | |

Waste Description

Organic ground media from destructive declassification operations including, but not limited to: computer tapes, VHS tapes, cartridges tapes, X-ray films, microfiche films and overhead projector films. E.A. and I.H. will inform Plant Engineering and the Chemists about the presence of regulated metals not appearing on this IGD so that appropriate steps are taken. Test for Visual Verification & TTLC, STLC, TCLP metals when regulated metals are used.

| | |
|--|----------------------------|
| Spent? | |
| Yes | |
| Were any of the above selected solvents mixed with any other substance prior to use? | Mixed with Description |
| N/A | N/A |
| Waste Minimization | Waste Minimization Comment |
| X - No waste minimization efforts were implemented for this waste | N/A |
| Source Code | |
| G13 - Cleaning out process equipment | |

Packaging/Container Type and Size**Packaging Guidance**

No packaging guidance listed

Container Type/Sizes

| Type | Size |
|------|------------------|
| DM | 55 Gallon Skoink |

Constituents

| Type | Constituent | UHC | Low Conc | High Conc | Unit of Measure | Comments |
|------|-------------------|-----|----------|-----------|-----------------|----------------|
| | Antimony (STLC) | No | 15.0 | 150.0 | milligram/liter | State |
| | Arsenic (STLC) | No | 5.0 | 50.0 | milligram/liter | State |
| | Barium (STLC) | No | 100.0 | 1000.0 | milligram/liter | State |
| | Cadmium (STLC) | No | 1.0 | 10.0 | milligram/liter | State |
| | Chromium (STLC) | No | 5.0 | 50.0 | milligram/liter | State |
| | Cobalt (STLC) | No | 80.0 | 800.0 | milligram/liter | State |
| | Copper (STLC) | No | 25.0 | 250.0 | milligram/liter | State |
| | Lead (STLC) | No | 5.0 | 50.0 | milligram/liter | State |
| | Mercury (STLC) | No | 0.2 | 2.0 | milligram/liter | State |
| | Molybdenum (STLC) | No | 350.0 | 3500.0 | milligram/liter | State |
| | Nickel (STLC) | No | 20.0 | 200.0 | milligram/liter | State |
| | Plastic | No | 99.0 | 100.0 | % | |
| | Selenium (TCLP) | No | 1.0 | 10.0 | milligram/liter | D010 - Federal |
| | Silver (STLC) | No | 5.0 | 50.0 | milligram/liter | State |
| | Vanadium (STLC) | No | 24.0 | 2400.0 | milligram/liter | State |
| | Zinc (STLC) | No | 250.0 | 2500.0 | milligram/liter | State |

Hazardous Review

| Is Listed Waste? | | Hazardous Properties | |
|------------------|--|----------------------|-----------------------------|
| No | | T | |
| State Codes | | EPA Codes | |
| CA - 181 | | D010 | |
| Form Code | | Form Code Comments | Chemical Compatability Code |
| W409 | | Organic ground media | DS |

Waste Characterization Summary

IGD No.: 00449.R1.3

Waste Type: RCRA HAZ (H)

Disposal Site:

| | | | |
|-------------|-----------------|----------------|-------------------|
| Field Tech | Efren Sifuentes | Approval Date | 06/23/2015 |
| Revision | 1.3 | Legacy IGD No. | 0297-9999-01-H-OG |
| Waste Form | Solid | Profile | |
| Periodicity | Ongoing | SPCC | No |

| Sampling & Analysis | | | |
|---|----------------------------------|----------------------------------|---------------------|
| Off Site Analysis (Certified) | On Site Analysis (Non Certified) | Field Tests and/or Documentation | Other Requirements |
| STLC Metals | | | Visual Verification |
| TCLP Metals | | | |
| TTLC Metals | | | |
| Other Sampling Comments | | | |
| Test for TTLC, STLC, TCLP metals when needed! | | | |